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HAEMATOZOA OF ITALIAN BIRDS. I: REDESCRIPTION
OF *LEUCOCYTOZoon MACLEANI* SAMBON, 1908
(*APICOMPLEXA HAEMOSPORINA*) FROM *PHASIANUS COLCHICUS*

Abstract. — It is suggested that *Leucocytozoon macleani* from *Phasianus colchicus* is a valid species and differs from other leucocytozoids described from Galliformes.

Riassunto. — Haematozoa degli Uccelli italiani. I: ridescrizione di *Leucocytozoon macleani* Sambon, 1908 (*Apicomplexa Haemosporina*), in *Phasianus colchicus*.

La specie differisce dalle altre descritte per i Galliformi e pertanto si può considerare valida.

Introduction.

Leucocytozoon macleani Sambon, 1908, observed in Pheasant (*Phasianus colchicus*), has been inadequately described and no measurements of the gametocytes accompanied the original paper. Similarly, BOING (1925) recorded infections of *Leucocytozoon* from 18 of 120 Pheasants examined, but no description of the parasite was given. These are the only records from the Pheasant in Western Europe (PEIRCE, 1981); in North America not one of 441 Pheasant sampled was infected (GREINER et al., 1975).

Consequently this species has been considered as species inquirenda.

Materials and methods.

Blood smears were obtained from 74 Pheasants captured from 1983 to 1984 near Pavia (Northern Italy). The redescription of *L. macleani* is made from 10 infected adult birds. The smears were air-dried, fixed

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in 100% methanol and stained with Giemsa's stain. The photomicrographs were prepared by a Zeiss photomicroscope III with a 100x planapochromat objective and an Optivar setting of 1.25. Measurements of gametocytes were made drawing the cells on the Visopan Reichert microscope (1 mm = 0.8 μ) and counting squares in a superimposed millimeter grid. Indices were calculated as defined by BENNETT et al. (1975).

Results.

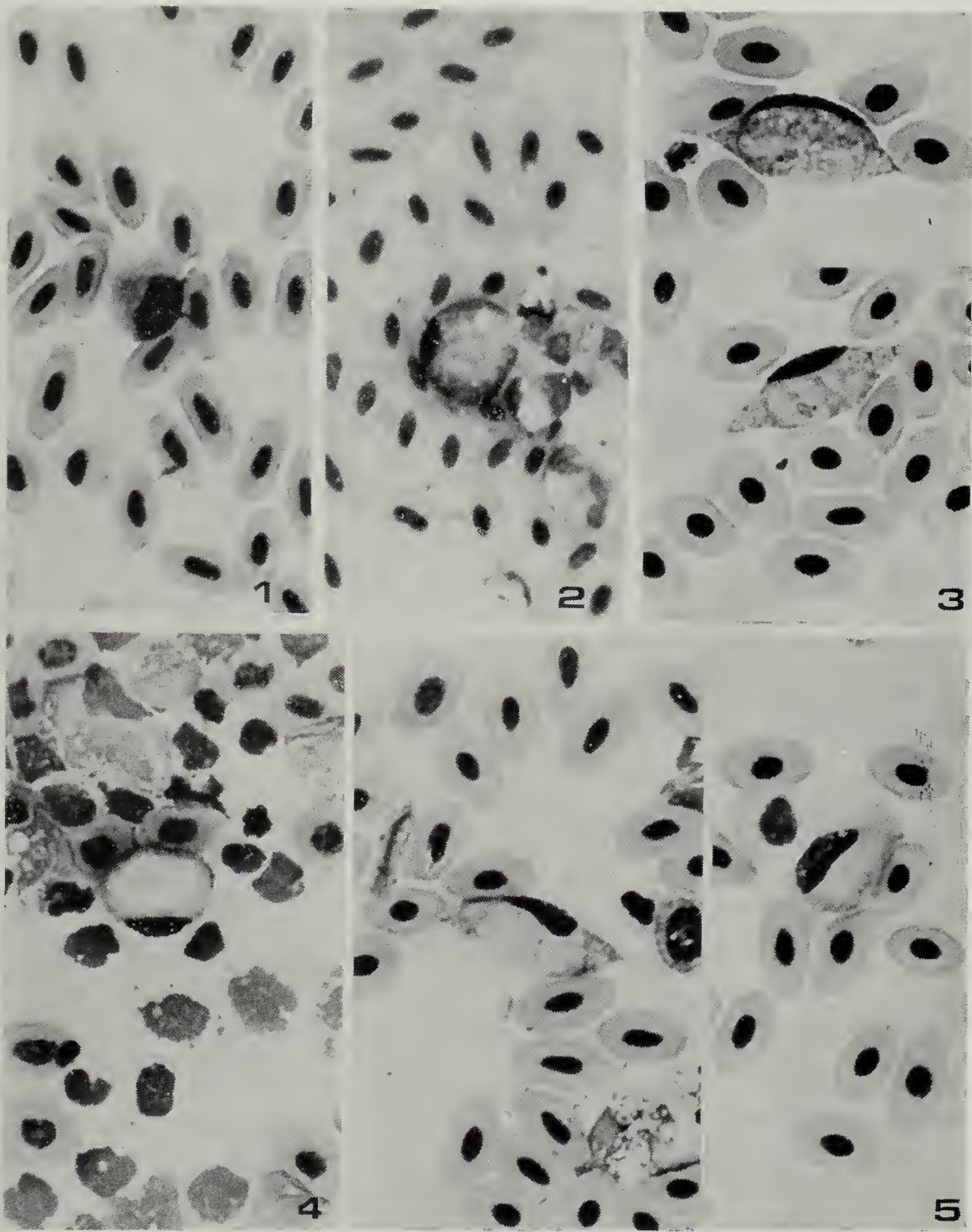
Of 74 Pheasants, examined 10 (13.5%) were infected but all had a low parasitaemia (<1‰), with a preponderance of macrogametocytes (sex ratio ♀ : ♂ = 1.8 : 1).

Redescription of *Leucocytozoon macleani* Sambon, 1908:

Young gametocytes: immature gametocytes lacking in the original description. We observed only immature macrogametocytes (fig. 1). roundish 12.0 by 10.4 μ , 51.8 μ^2 , in area; parasite cytoplasm staining blue with small vacuoles; nucleus round, centrally placed with nucleolus. Host cell nucleus hypertrophic 10.0 by 5.2 μ , 36.5 μ^2 , in area and laterally displaced.

Macrogametocytes round and fusiform (figs. 2, 3). *Round* extremely rare, lacking in the original description; 16.4 by 15.6 μ , 174.7 μ^2 in area; parasite cytoplasm staining deep blue with vacuoles of different size; nucleus irregular, laterally placed; nucleolus present. Host cell nucleus flattened, laterally positioned 8.0 by 2.8 μ , 16.6 μ^2 in area. Host cell cytoplasm lacking. *Fusiform* parasite, cytoplasm staining blue and containing numerous vacuoles of unequal size; nucleus irregular eccentrically placed, reddish and surrounded by a light pink halo; nucleolus prominent, staining dark red. Host cell nucleus flattened and applied laterally to the gametocyte. Infected host cell spindle shaped with remaining host cell cytoplasm forming wings of variable size. Morphometric parameters are presented in table I.

Microgametocytes round and fusiform (figs. 4, 5). *Round* extremely rare, lacking in the original description; 14.4 by 12.8 μ , 121.0 μ^2 in area; parasite cytoplasm staining faint rose; nucleus diffuse. Host cell nucleus flattened and lateral to parasite 8.8 by 2.4 μ , 16.6 μ^2 in area. Host cell cytoplasm lacking. *Fusiform* parasite, cytoplasm staining faint rose without or with less vacuoles than the macrogametocytes; nucleus diffuse with chromatophilic granulations. Host cell nucleus flattened and lateral to gametocyte. Infected host cell oval or spindle shape, with polar cyto-



Figs. 1-5. — *Leucocytozoon macleani* from Pheasant. 1, Immature macrogametocyte. - 2, Round macrogametocyte. - 3, Fusiform macrogametocytes. - 4, Round microgametocyte. - 5, Fusiform microgametocytes.

plasmatic horns of inequal size. Morphometric parameter are present in table I.

| | |
|---------------|--|
| Parasite: | <i>Leucocytozoon macleani</i> Sambon, 1908 |
| Host: | <i>Phasianus colchicus</i> |
| Vector: | Unknown |
| Distribution: | U.K., Italy |
| Material: | deposited in Dipartimento di Biologia Animale, University of Pavia (in the Authors' collection). |

TABLE I. — Morphometric parameters of *Leucocytozoon macleani*.
All dimensions expressed in μ and based on mean of 10 fusiform gametocytes and 10 normal erythrocytes.
Figures in parentheses are standard deviations.

| | Length | Width | Area |
|-------------------------------|--|----------|-------------|
| Macrogametocytes | 17.9(1.4) | 9.6(1.4) | 113.9(17.6) |
| Host cell nucleus | 11.8(1.8) | 2.7(0.6) | 22.3(6.9) |
| Microgametocyte | 13.7(2.0) | 7.9(1.5) | 84.2(14.7) |
| Host cell nucleus | 10.8(2.0) | 3.0(0.7) | 21.5(3.7) |
| Normal erythrocyte | 12.3(0.3) | 6.7(0.3) | 51.6(4.8) |
| Nucleus of normal erythrocyte | 5.2(0.4) | 2.2(0.4) | 7.8(1.7) |
| Host nuclear index | macrogametocyte 2.9 microgametocyte 2.8 | | |
| Parasite index | macrogametocyte 2.2 microgametocyte 1.6 | | |
| Host-parasite index | macrogametocyte 2.6 microgametocyte 2.1 | | |

| | | |
|---------------------|---|--|
| Host nuclear index | = | area of the host cell nucleus of gametocyte/area of the nucleus of the normal erythrocyte. |
| Parasite index | = | area of the gametocyte/area of normal erythrocyte. |
| Host-parasite index | = | area of the host cell-parasite complex/area of normal erythrocyte. |

Discussion.

No deposition or designation of type material was given in the original description of *L. macleani*, nor the percentage of infected birds. SAMBON (1908) shows only three drawings of gametocytes (fusiform) and gives a very short description « only a few gametocytes were seen; they resembled to those found in the capercailzie. Some presented large vacuoles, probably owing to degeneration ». BOING (1925) found elongate gametocytes of *Leucocytozoon* sp. in Pheasant captured in Germany, but round forms were not described. This material may not be compared taxonomically with that by Sambon (1908).

We suggest that *L. macleani* redescribed here is a valid species and differs from other leucocytozoids found in Galliformes and particularly from *L. lovati* and *L. masoni* described by SAMBON (1908) from British birds. We prefer to retain the specific designation of *L. macleani* Sambon, 1908 for our material, even though the original description gives few recognizable morphological characteres, in order to avoid adding yet more specific names to the nomenclature. We believe that it is impossible to describe a new species of *Leucocytozoon* from a natural host without a full elucidation of the life cycle of the parasite.

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